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| 10/720,308 | 11/25/2003 | Yasunori Kaneda | H-1121 | 4719 |

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| EXAMINER |
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SAVLA, ARPAN P

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| ART UNIT | PAPER NUMBER |
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2185

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 12/27/2006 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| | | | |
|------------------------------|-------------------------------|-------------------------------|--|
| Office Action Summary | Application No. 10/720,308 | Applicant(s) KANEDA ET AL. | |
| | Examiner Arpan P. Savla | Art Unit 2185 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>7/12/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This Office action is in response to Applicant's communication filed October 5, 2006 in response to the Office action dated June 6, 2006. Claims 1-13 have been canceled. New claims 14-32 have been added. Claims 14-32 are pending in this application.

ACKNOWLEDGMENT OF REFERENCES CITED BY APPLICANT

Information Disclosure Statement

1. As required by MPEP § 609(c), Applicant's submission of the Information Disclosure Statement dated July 12, 2006 is acknowledged by the Examiner and cited references have been considered in the examination of the claims now pending. As required by MPEP § 609 c(2), a copy of the PTOL-1449 initialed and dated by the Examiner is attached to the instant Office action.

OBJECTIONS

Specification

2. In view of Applicant's amendment, the objections to the specification been withdrawn.

Claims

3. **Claims 15-22 and 24-32** are objected to because the phrase "A data storage apparatus according to claim..." on lines 1 respectively should instead read "The data storage apparatus according to claim..."

REJECTIONS NOT BASED ON PRIOR ART

Claim Rejections - 35 USC § 101

4. In view of Applicant's amendment, the 101 rejections to **claims 10-11** have been withdrawn.

Claim Rejections - 35 USC § 112

5. In view of Applicant's amendment, the 112 rejections to **claims 4-5** have been withdrawn.

REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 14-17, 23-26, and 32 are rejected under U.S.C. 102(b) as being anticipated by Allen et al. (U.S. Patent 5,546,557).**

8. **As per claim 14**, Allen discloses a data storage apparatus coupled to a computer, comprising:

a control unit coupled to the computer (col. 14, lines 45-47; Fig. 6, elements 45 and 52); *It should be noted that the one of host processors 45 is analogous to the "computer."*

a memory coupled to the control unit (col. 15, lines 2-4);

a storage device being a non-removable storage medium and coupled to the control unit (col. 10, lines 49-52; col. 14, lines 52-55; col. 22, lines 13-16; Fig. 6, element 54); *It should be noted that the "PVPs" are analogous to the "storage device being a non-removable storage medium."*

a first storage volume and a second storage volume configured on the storage device (col. 9, lines 63-65; col. 11, lines 25-40; Fig. 4), *It should be noted that the first and second "LV's" are analogous to the "first storage volume" and the "second storage volume."*

wherein the control unit provides a virtual disk drive unit for the computer so that the control unit makes the computer recognize that the virtual disk drive unit handles a removable storage medium (col. 14, lines 50-52; col. 27, lines 20-30; Fig. 5, element 53; Fig. 18), *It should be noted that the "DVE" is analogous to the "virtual disk drive unit." It should also be noted that the LV's act as removable storage media.*

wherein, in response to receiving a first instruction for loading the removable storage medium to the virtual disk drive unit, the control unit modifies relationship information to make a relation between the first storage volume and the virtual disk drive unit, so that the control unit makes the computer recognize that the first storage volume is loaded to the virtual disk drive unit as the removable storage medium (col. 10, lines 1-9; col. 20, lines 9-26; Fig. 7). *It should be noted that the "MOUNT command" is analogous to the "first instruction" and the "data base" in Fig. 7 is analogous to the "relationship information."*

9. **As per claim 15**, Allen discloses wherein, based on receiving a second instruction for ejecting the removable storage medium from the virtual disk drive unit from the computer, the control unit modifies the relationship information to delete the relation between the first storage volume and the virtual disk drive unit, so that the control unit makes the computer recognize that the first storage volume is ejected from the virtual disk drive unit as the removable storage medium (col. 23, lines 26-47; col. 24, lines 13-14); *It should be noted that the "migrate command" is analogous to the "second instruction."*

the control unit notifies the computer of completion of ejecting the first storage volume from the virtual disk drive unit (col. 24, lines 13-14).

10. **As per claim 16**, Allen discloses wherein the first instruction is sent from a management computer which is coupled to the data storage apparatus (col. 20, lines 32-33; Fig. 6, element 45); *It should be noted that another one of host processors 45 is analogous to the "management computer."*

and wherein, wherein the control unit notifies the management computer of loading the first storage volume to the virtual disk drive unit (col. 26, lines 23-28).

11. **As per claim 17**, Allen discloses wherein the first instruction is sent from the computer (col. 20, lines 32-33; Fig. 6, element 45).

12. **As per claim 23**, Allen discloses a data storage system comprising:

a computer (col. 14, lines 17-20; Fig. 6, element 45);

a data storage apparatus, coupled to the computer (Fig. 6, element 48), which includes a plurality of storage volumes which are configured by a non-removable storage medium (col. 10, lines 49-52; col. 14, lines 52-55; col. 22, lines 13-16; Fig. 6, element 54) and provides a virtual disk drive unit for the computer, the data storage apparatus making the computer recognize that the virtual disk drive unit handles removable storage mediums (col. 14, lines 50-52; col. 27, lines 20-30; Fig. 5, element 53; Fig. 18); *See the citation notes for claim 14 above.*

wherein the computer sends a first instruction to the data storage apparatus to eject a first removable storage medium of the removable storage mediums from the virtual disk drive unit (col. 22, line 38); *See the citation notes for claim 15 above.*

in response to receiving the first instruction, the data storage apparatus notifies the computer of completion of ejecting the first removable storage medium from the virtual disk drive unit (col. 24, lines 13-14). *See the citation notes for claim 15 above.*

13. **As per claim 24**, Allen discloses wherein the data storage apparatus modifies relationship information to delete a relation between the virtual drive unit and a first storage volume of the plurality of storage volumes so that the data storage apparatus

makes the computer recognize that the first storage volume is loaded to the virtual disk drive unit as the first removable storage medium in response to receiving the first instruction (col. 23, lines 26-47). *See the citation notes for claim 15 above.*

14. **As per claim 25**, Allen discloses a management computer coupled to the data storage apparatus (Fig. 6, element 45), wherein the management computer sends a second instruction to the data storage apparatus to load the first removable storage medium to the virtual disk drive unit (col. 10, lines 1-9); *See the citation notes for claims 14 and 16 above.*

in response to receiving the second instruction from the management computer, the data storage apparatus modifies the relationship information to create the relation between the virtual disk drive unit and the first storage volume so that the data storage apparatus makes the computer recognize that the first storage volume is loaded to the virtual disk drive unit as the first removable storage medium (col. 20, lines 9-26; Fig. 7). *See the citation notes for claim 14 above.*

15. **As per claim 26**, Allen discloses wherein the computer sends a second instruction to the data storage apparatus to load the first removable storage medium to the virtual disk drive unit (col. 10, lines 1-9), *See the citation notes for claim 14 above.*

in response to receiving the second instruction from the computer, the data storage apparatus modifies the relationship information to create the relation between the virtual disk drive unit and the first storage volume so that the data storage apparatus makes the computer recognize that the first storage volume is loaded to the virtual disk

drive unit as the first removable storage medium (col. 20, lines 9-26; Fig. 7). *See the citation notes for claim 14 above.*

16. **As per claim 32**, Allen discloses the computer recognizes that the data storage apparatus includes the non-removable storage medium (col. 16, lines 57-62).

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. **Claims 20, 22, and 27-29** are rejected under 35 U.S.C. 103(a) as being obvious over Allen in view of Ofek (U.S. Patent 6,101,497).

19. **As per claim 20**, Allen discloses all the limitations of claim 20 except the second the second storage volume is set as a replica volume of the first storage volume,
and wherein the control unit stores data into the first storage volume and the second storage volume if the control unit receives a write command for writing data to the removable storage medium from the computer.

Sekido discloses the second the second storage volume is set as a replica volume of the first storage volume (col. 8, lines 32-34 and 52-56; Fig. 1, elements 15, 196, 42, and 43);

and wherein the control unit stores data into the first storage volume and the second storage volume if the control unit receives a write command for writing data to the removable storage medium from the computer (col. 11, lines 5-13).

Allen and Ofek are analogous art because they are from the same field of endeavor, that being storage systems.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement Ofek's mirror system within Allen's data storage system.

The motivation for doing so would have been to increase system reliability by providing a data processing system that includes redundant storage of data and that enables access to the data by multiple processes. (Ofek, col. 6, lines 3-5).

Therefore, it would have been obvious to combine Allen and Ofek for the benefit of obtaining the invention as specified in claim 20.

20. **As per claim 22**, the combination of Allen/Ofek discloses the second storage volume is set as a replica volume of the first storage volume (Ofek, col. 8, lines 32-34 and 52-56; Fig. 1, elements 15, 196, 42, and 43);

wherein the control unit stores data into the first storage volume and the second storage volume if the control unit receives a write command for writing data to the removable storage medium from the computer (Ofek, col. 11, lines 5-13).

and wherein, based on receiving the second instruction from the computer, the control unit stops storing the data into the second storage volume (Ofek, col. 11, lines 24-30; col. 30, lines 35-37). *It should be noted that that instruction for "independent operating mode" is analogous also to the "second instruction" because in independent*

operating mode the local system is effectively "ejected" from the network leaving the remote system to operate independently.

21. **As per claim 27**, the combination of Allen/Ofek discloses a second storage volume of the plurality of storage volumes is set as a replica storage volume of the first storage volume (Ofek, col. 8, lines 32-34 and 52-56; Fig. 1, elements 15, 196, 42, and 43);

wherein the computer sends a write command for storing data into the first removable storage medium to the data storage apparatus (Ofek, col. 11, lines 5-7); *It should be noted it is inherently required a write command be sent in order for host system 13 to update volumes 15 and 16.*

and in response to receiving the write command, the data storage apparatus stores the data into the first storage volume and the second storage volume (Ofek, col. 11, lines 5-13).

22. **As per claim 28**, the combination of Allen/Ofek discloses the computer sends a third instruction to the data storage apparatus for stopping data replication (Ofek, col. 11, lines 24-30); *See the citation note for claim 21 above.*

in response to receiving the third instruction, the data storage apparatus stops storing the data into the second storage volume (Ofek, col. 11, lines 24-30; col. 30, lines 35-37). *See the citation note for claim 21 above.*

As per claim 29, the combination of Allen/Ofek discloses a second storage volume of the plurality of storage volumes is set as a replica storage volume of the first storage volume (Ofek, col. 8, lines 32-34 and 52-56; Fig. 1, elements 15, 196, 42, and

43),

wherein the computer sends a write command for storing data into the first removable storage medium to the data storage apparatus (Ofek, col. 11, lines 5-7); See *the citation note for claim 27 above*.

in response to receiving the write command, the data storage apparatus stores the data into the first storage volume and the second storage volume (Ofek, col. 11, lines 5-13),

and in response to receiving the first instruction, the data storage apparatus stops storing the data into the second storage volume and notifies the computer of completion of re-loading the first removable storage to the virtual disk drive unit (Ofek, col. 11, lines 5-7; Allen, col. 10, lines 1-9; col. 20, lines 9-26; Fig. 7).

23. **Claims 18-19 and 30-31 are rejected under 35 U.S.C. 103(a) as being obvious over Allen in view of Sekido (U.S. Patent 6,311,193).**

24. **As per claim 18**, Allen discloses all the limitations of claim 18 except in response to receiving a verification command for confirming a type of the virtual disk drive unit in the data storage apparatus from the computer, the control unit sends a reply indicating that the virtual disk drive unit handles the removable storage medium even though the data storage apparatus has the storage device which is the non-removable storage medium.

Sekido discloses in response to receiving a verification command for confirming a type of the virtual disk drive unit in the data storage apparatus from the computer, the control unit sends a reply indicating that the virtual disk drive unit handles the removable

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storage medium even though the data storage apparatus has the storage device which is the non-removable storage medium (col. 12, lines 19-24). *It should be noted that the "inquiry" is analogous to the "verification command."* *It should also be noted that it is inherently required there be some sort of "drive" in order to interface with the disks.* *Lastly, it should be noted that the "disk snapshot section" of the data storage apparatus is a non-removable storage medium.*

Allen and Sekido are analogous art because they are from the same field of endeavor, that being storage systems.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement Sekido's virtual removable disk within Allen's data storage system.

The motivation for doing so would have been to eliminate the problem of upper limits on number of disks visible to programs, thus making it easier to manage the computer system (Sekido, col. 11, lines 56-62).

Therefore, it would have been obvious to combine Allen and Sekido for the benefit of obtaining the invention as specified in claim 18.

25. **As per claim 19**, the combination of Allen/Sekido discloses wherein, in response to receiving a verification command for verifying a type of the virtual disk drive unit of the data storage apparatus from the computer, the control unit sends a reply indicating that the virtual disk drive unit is a magnetic disk drive unit which handles the removable storage medium even though the data storage apparatus has the storage device which is non-removable storage medium (Sekido, col. 12, lines 14-24). *See the citation note*

for claim 18 above.

26. **As per claim 30**, the combination of Allen/Sekido discloses wherein the computer sends a verification command for verifying a type of the virtual disk drive unit in the data storage apparatus to the data storage apparatus (Sekido, lines 23-24), and in response to receiving the verification command, the data storage apparatus sends a reply indicating that the virtual disk drive unit handles the removable storage medium even though the data storage apparatus has the non-removable storage medium (Sekido, col. 12, lines 19-24). *See the citation note for claim 18 above.*

27. **As per claim 31**, the combination of Allen/Sekido discloses wherein the computer sends a verification command for verifying a type of the virtual disk drive unit in the data storage apparatus to the data storage apparatus (Sekido, lines 23-24), and in response to receiving the verification command, the data storage apparatus sends a reply indicating that the virtual disk drive unit is a magnetic disk drive which has the removable storage medium even though the data storage apparatus has a hard disk drive which includes the non-removable storage medium (Sekido, col. 12, lines 19-24). *See the citation note for claim 18 above.*

28. **Claim 21 is rejected under 35 U.S.C. 103(a) as being obvious over Allen in view of Sekido as applied to claim 19 above, and in further view of Ofek.**

29. The combination of Allen/Sekido discloses all the limitations of claim 21 except n response to receiving a third instruction for stopping a replication from the computer, the control unit stops storing the data into the second storage volume.

Ofek discloses in response to receiving a third instruction for stopping a

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replication from the computer, the control unit stops storing the data into the second storage volume (col. 11, lines 24-30; col. 30, lines 35-37). *It should be noted that the instruction for "independent operating mode" is analogous to the "third instruction."*

The combination of Allen/Seikdo and Ofek are analogous art because they are from the same field of endeavor, that being storage systems.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement Ofek's mirror system within Allen/Sekido's data storage system.

The motivation for doing so would have been to increase system reliability by providing a data processing system that includes redundant storage of data and that enables access to the data by multiple processes. (Ofek, col. 6, lines 3-5).

Therefore, it would have been obvious to combine Allen/Sekido and Ofek for the benefit of obtaining the invention as specified in claim 21.

Response to Arguments

30. Applicant's arguments with respect to **claims 14-32** have been considered but are moot in view of the new grounds of rejection above.

Conclusion

STATUS OF CLAIMS IN THE APPLICATION

The following is a summary of the treatment and status of all claims in the application as recommended by MPEP 707.70(i):

CLAIMS REJECTED IN THE APPLICATION

Per the instant office action, **claims 14-32** have received a second action on the merits and are subject of a second action final.

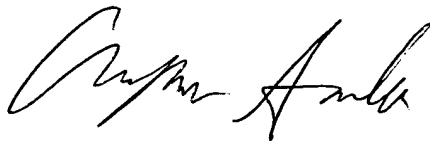
Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

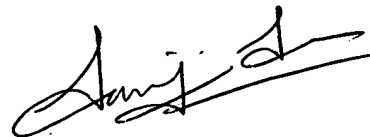
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arpan P. Savla whose telephone number is (571) 272-1077. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571) 272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Arpan Savla
Art Unit 2185
December 18, 2006



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